

For information about accredited programs and educational requirements, contact:

☛ Commission on Dental Accreditation, American Dental Association, 211 E. Chicago Ave., Suite 1814, Chicago, IL 60611.

Internet: <http://www.ada.org>

The State Board of Dental Examiners in each State can supply information on licensing requirements.

## Electroneurodiagnostic Technologists

(O\*NET 32923)

### Significant Points

- The number of job openings created will be limited by slower than average employment growth and low replacement needs.
- Most technologists learn on the job, but opportunities should be best for technologists with formal postsecondary training.

### Nature of the Work

Electroneurodiagnostic technologists use instruments such as an electroencephalograph (EEG) machine, to record electrical impulses transmitted by the brain and the nervous system. They help physicians diagnose brain tumors, strokes, epilepsy, and sleep disorders. They also measure the effects of infectious diseases on the brain, as well as determine whether individuals with mental or behavioral problems have an organic impairment, such as Alzheimer's disease. Furthermore, they determine *cerebral death*, the absence of brain activity, and assess the probability of recovery from a coma.

Electroneurodiagnostic technologists who specialize in basic or *resting* EEGs are called *EEG technologists*. The range of tests performed by electroneurodiagnostic technologists is broader than, but includes, those conducted by EEG technologists. Because it provides a more accurate description of work typically performed in the field, the title electroneurodiagnostic technologists generally has replaced that of EEG technologist.

Electroneurodiagnostic technologists take patients' medical histories, help patients relax, and then apply electrodes to designated spots on the patient's head. They must choose the most appropriate combination of instrument controls and electrodes, to correct for mechanical and electrical interference from somewhere other than the brain, such as eye movement or radiation from electrical sources.

Increasingly, technologists perform EEGs in the operating room, which requires that they understand anesthesia's effect on brain waves. For special procedure EEGs, technologists may secure electrodes to the chest, arm, leg, or spinal column, to record activity from both the central and peripheral nervous systems.

In ambulatory monitoring, technologists attach small recorders to patients to monitor the brain, and sometimes the heart, while patients carry out normal activities over a 24-hour period. They then remove the recorder and obtain a readout. Technologists review the readouts, selecting sections for the physician to examine.

Using *evoked potential* testing, technologists measure sensory and physical responses to specific stimuli. After attaching electrodes to the patient, they set the instrument for the type and intensity of the stimulus, increase the intensity until the patient reacts, and note the sensation level.

For nerve conduction tests, used to diagnose muscle and nerve problems, technologists place electrodes on the patient's skin over a nerve and over a muscle. Then they stimulate the nerve with an electrical current and record how long it takes the nerve impulse to reach the muscle.

Technologists who specialize in and administer sleep disorder studies are called *polysomnographic technologists*. Sleep disorder

studies are usually conducted in a clinic called a sleep center. During the procedure, these technologists monitor the patient's respiration and heart and brain wave activity. These workers must know the dynamics of the cardiopulmonary systems during each stage of sleep. They coordinate readings from several organ systems, separate the readings according to the stages of sleep, and relay results to the physician. Polysomnographic technologists may also write technical reports summarizing test results.

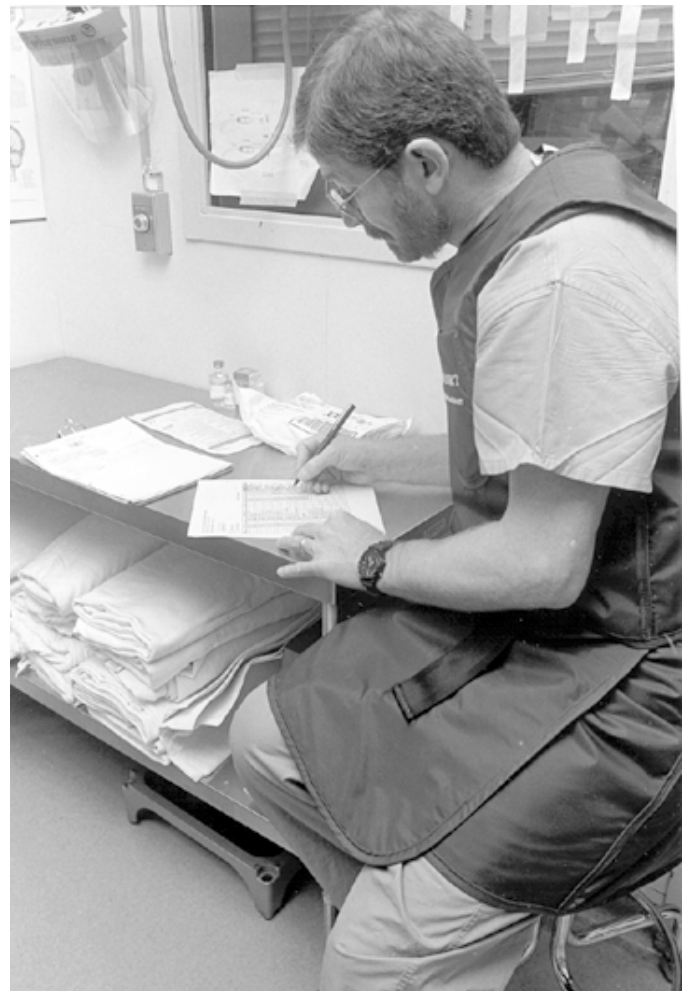
Additionally, technologists look for changes in a patient's neurologic, cardiac, and respiratory status, which may indicate an emergency, such as a heart attack, and provide emergency care until help arrives.

Electroneurodiagnostic technologists may have supervisory or administrative responsibilities. They may manage an electroneurodiagnostic laboratory, arrange work schedules, keep records, schedule appointments, order supplies, provide instruction to less-experienced technologists, and maintain equipment.

### Working Conditions

Electroneurodiagnostic technologists usually work in clean, well-lighted surroundings and spend about half of their time on their feet. They often work with patients who are very ill and require assistance. Technologists employed in hospitals may do all their work in a single room or may push equipment to a patient's bedside and obtain recordings there.

Most technologists work a standard workweek, although those in hospitals may be on call evenings, weekends, and holidays. Those performing sleep studies usually work evenings and nights.



An electroneurodiagnostic technologist evaluates the results of an electroencephalograph (EEG).

## Employment

Electroneurodiagnostic technologists held about 5,400 jobs in 1998. Most worked in neurology laboratories of hospitals, whereas others worked in offices and clinics of neurologists and neurosurgeons, sleep centers, or psychiatric facilities.

## Training, Other Qualifications, and Advancement

Although most electroneurodiagnostic technologists currently employed learned their skills on the job, employers are beginning to favor those who have completed formal training. Some hospitals require applicants for trainee positions to have postsecondary training, whereas others only expect a high school diploma. Recommended high school and college subjects for prospective technologists include health, biology, anatomy, and mathematics. Often, on-the-job trainees are transfers from other hospital jobs, such as licensed practical nurses.

Formal postsecondary training is offered in hospitals and community colleges. In 1998, the Joint Review Committee on Education in Electroneurodiagnostic Technology approved 12 formal programs. Programs usually last from 1 to 2 years and include laboratory experience, as well as classroom instruction in human anatomy and physiology, neurology, neuroanatomy, neurophysiology, medical terminology, computer technology, electronics, and instrumentation. Graduates receive associate degrees or certificates.

The American Board of Registration of Electroencephalographic and Evoked Potential Technologists awards the credentials Registered EEG Technologist, Registered Evoked Potential Technologist, and Certificate in Neurophysiologic Intraoperative Monitoring to qualified applicants. The Association of Polysomnographic Technologists registers polysomnographic technologists. Applicants interested in taking the registration exam must have worked in a sleep center for at least 1 year. Although not generally required for staff level jobs, registration indicates professional competence, and is usually necessary for supervisory or teaching jobs. In addition, the American Association of Electrodiagnostic Technologists provides certification in the field of nerve conduction studies for electroneurodiagnostic technologists.

These technologists should have manual dexterity, good vision, good writing skills, an aptitude for working with electronic equipment, and the ability to work with patients as well as with other health personnel.

Experienced electroneurodiagnostic technologists can advance to chief or manager of an electroneurodiagnostic laboratory. Chief technologists are generally supervised by a physician—an electroencephalographer, neurologist, or neurosurgeon. Technologists may also teach or go into research.

## Job Outlook

Employment of electroneurodiagnostic technologists is expected to grow more slowly than the average for all occupations through the year 2008. Although employment will increase as new procedures and technologies are developed and as the size of the population grows, productivity gains caused by increasingly sophisticated equipment and cross-trained employees will limit employment growth. Only a small number of openings are expected each year, due primarily to the need to replace technologists who transfer to other occupations or retire. Most jobs will be found in hospitals, but growth will be fastest in offices and clinics of neurologists.

## Earnings

Median annual earnings of electroneurodiagnostic technologists were \$32,070 in 1998. The middle 50 percent earned between \$26,610 and \$38,500 a year. The lowest 10 percent earned less than \$22,200 and the highest 10 percent earned more than \$46,620 a year.

## Related Occupations

Other health personnel who operate medical equipment to diagnose and treat patients include radiologic technologists, nuclear medicine technologists, sonographers, perfusionists, and cardiovascular technologists.

## Sources of Additional Information

For general information about a career in electroneurodiagnostics and a list of accredited training programs, contact:

✦ Executive Office, American Society of Electroneurodiagnostic Technologists, Inc., 204 W. 7<sup>th</sup> St., Carroll, IA 51401.

Internet: <http://www.aset.org>

For information on opportunities in sleep studies, contact:

✦ Association of Polysomnographic Technology, 2025 South Washington, Suite 300, Lansing, MI 48910-0817.

Information about specific accredited training programs is also available from:

✦ Joint Review Committee on Electroneurodiagnostic Technology, Route 1, Box 63A, Genoa, WI 54632.

Information on becoming a registered electroneurodiagnostic technologist is available from:

✦ American Board of Registration of Electroencephalographic and Evoked Potential Technologists, P.O. Box 916633, Longwood, FL 32791-6633.

Information on certification in the field of nerve conduction studies is available from:

✦ American Association of Electrodiagnostic Technologists, 35 Hallett Lane, Chatham, MA 02633-2408.

# Emergency Medical Technicians and Paramedics

(O\*NET 32508)

## Significant Points

- Irregular hours and treating patients in life-or-death situations lead to job stress in this occupation.
- State requirements vary, but formal training and certification are required.
- Employment is projected to grow rapidly as paid emergency medical technician positions replace unpaid volunteers.

## Nature of the Work

People's lives often depend on the quick reaction and competent care of emergency medical technicians (EMTs) and paramedics. Incidents as varied as automobile accidents, heart attacks, drownings, childbirth, and gunshot wounds all require immediate medical attention. EMTs and paramedics provide this vital attention as they care for and transport the sick or injured to a medical facility.

Depending on the nature of the emergency, EMTs and paramedics typically are dispatched to the scene by a 911 operator and often work with police and fire department personnel. Once they arrive, they determine the nature and extent of the patient's condition while trying to ascertain whether the patient has preexisting medical problems. Following strict procedures, they give appropriate emergency care and transport the patient. Some conditions can be handled following general rules and guidelines, while more complicated problems are carried out under the direction of medical doctors by radio.

EMTs and paramedics may use special equipment such as backboards to immobilize patients before placing them on stretchers and securing them in the ambulance for transport to a medical facility. Usually, one EMT or paramedic drives while the other monitors the patient's vital signs and gives additional care as